

REMARKS

Reconsideration of the application in light of the amendments and the following remarks is respectfully requested. Applicants submit that this Amendment places the application in condition for allowance and/or better condition for appeal and requests entry of this Amendment with the Examiner's approval.

Status of the Claims

Claims 1-19 are pending. Claims 1, 16, 17, and 19 have been amended. No new matter has been added.

Claim 16 has been amended to remove an unnecessary repetition of the word "the." No other amendments to Claim 16 have been made. This amendment does not change the scope of the subject matter recited therein.

Rejection Under 35 U.S.C. § 112

Claims 1-19 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention. The Examiner contends the feature "three dimensional shapes of objects" is unclear, and further contends that there is no connection between the objects and the x-ray imaging systems. (Detailed Action, item 2, page 2.)

Claims 1, 17, and 19 have been amended to recite "three dimensional external shapes corresponding to three dimensional external shapes of the X-ray imaging system." Support for this amendment can be found in the specification at page 11, lines 29-31. Applicants submit that the claims as amended particularly point out and distinctly claim the subject matter of the invention.

Furthermore, this amendment does not require a new search because the amended language is similar in scope to claim language present in the application prior to the October 12, 2005 Non-final Office Action. Therefore, Applicants respectfully request reconsideration and withdrawal of the rejection.

Rejection Under 35 U.S.C. § 103

Claims 1-19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Iizuka (U.S. Patent No. 6,435,713) in view of Alexandrescu (U.S. Patent No. 6,272,368) and Wakabayashi (U.S. Patent No. 6,407,738). Applicants respectfully traverse the rejection.

The Examiner contends that Iizuka discloses most of the claimed features. The Examiner acknowledges that Iizuka failed to disclose a shape data registering means for registering external shape data of three dimensional models corresponding to three dimensional shapes of objects, wherein the models are in voxel data tree format. However, the Examiner relies on Alexandrescu as disclosing “a shape data registering means (11, 15) for registering external shape data of three-dimensional models in triangular format corresponding to three-dimensional shapes of an x-ray imaging system (1, 2, 3) and a patient support (8); and a position relation detecting means for obtaining in real time information regarding positional relations of the x-ray imaging system and the patient support based on current positions of x-ray imaging system and the patient support, and the external shape data of the three dimensional model.” (Detailed Action, page 3). The Examiner further relies on Wakabayashi as disclosing the use of “a three-dimensional model formulation using voxel data tree format.” (Detailed Action, page 4). The Examiner states that it would have been obvious for a person of ordinary skill in the art at the time of the invention to combine Iizuka, Alexandrescu, and Wakabayashi to achieve the claimed invention. (Detailed Action, page 4.)

Wakabayashi is directed to a method for analytical model formulation for numerical analysis, specifically using the finite element method. (Column 1, lines 5-12.) In order to

perform finite element analysis, the shape models defined by CAD data must be converted into fine elements such as tetrahedral or hexahedral elements via element division. (Column 1, lines 15-19.) Tetrahedral elements are not preferred because they provide a poor analytical accuracy when using the finite element method for analysis. (Column 1, lines 19-22.) Hexahedral elements provide a good analytical accuracy, but “fine rectangles (voxels) had to be used to improve the analytical accuracy” resulting in a number of elements “so large that no conventional analytical processing units (software for analysis) could be used.” (Column 1, lines 38-42.)

Wakabayashi notes these problems and suggests “[t]he objectives of the present invention are to solve the problems of the above mentioned conventional examples.” (Column 1, lines 49-50.) Wakabayashi discloses converting the voxel data to octree data because an “octree can display a shape using fewer rectangles than the voxel.” (Column 2, lines 9-11.) Wakabayashi provides at least two examples to demonstrate this point. In one example, voxel data requires 30,624 elements and the same representation in octree data requires 1,000 elements. (Column 14, lines 33-37.) In another example, 31,240 elements and 36,594 nodes are obtained using voxel data while octree data reduces these numbers to 475 elements and 1,355 nodes. (Column 15, lines 16-20.)

Wakabayashi further teaches away from the use of voxels by explaining “[b]ecause an analytical model is obtained using octree data in the present invention, fewer elements are required for the analytical model, compared with an analytical model using voxel data.” (Column 14, lines 62-65.) Wakabayashi also notes that “[a]nalysis using a conventional processing unit is possible” when octree data is utilized instead of voxel data. (Column 14, lines 63-66.) Because Wakabayashi teaches away from the use of voxels in favor of octrees, Wakabayashi teaches away from the use of voxels in the present invention. Thus, Wakabayashi is not a proper reference for demonstrating that the use of voxels with the disclosure of Iizuka and Alexandrescu would have been obvious to one of ordinary skill in the art.

Wakabayashi cannot be used to meet the Examiner's burden of establishing a case of *prima facie* obviousness because there is no motivation to combine Wakabayashi with either Iizuka or Alexandrescu. The Examiner's proposed motivation that a person would be motivated to prevent a collision between various objects (e.g. x-ray imaging systems, patient support, personnel) within the radiographic x-ray device by monitoring the positions and the positional relations of the various objects is not disclosed or suggested by Wakabayashi because Wakabayashi is directed to an entirely different problem, i.e., analytical model formulation for numerical analysis, specifically using the finite element method. (Column 1, lines 5-12.) The Examiner must show some objective teaching from the art that would lead an individual to combine the references, i.e., there must be motivation. In particular, "[t]he mere fact that the prior art may be modified in the manner suggested by the examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260, 23 U.S.P.Q. 2d 1780, 1783 (Fed. Cir. 1992) (emphasis added). Wakabayashi and the other prior art of record provide no suggestion that it would be desirable to modify Wakabayashi in the manner suggested by the examiner. As discussed above, Wakabayashi is directed to a system and method of converting voxel data to octree data to reduce the number of elements to be calculated using the finite element method. (Column 1, lines 5-42.) The finite element method is an analysis method for calculating stress distributions, etc. by calculating stress and/or strain acting between adjacent cells in analytical models. (Column 14, lines 53-55.)

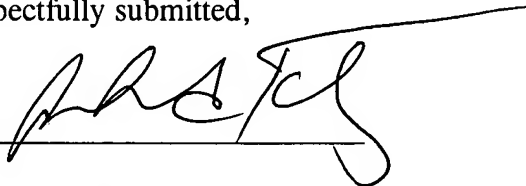
In contrast, Applicants' claimed invention is directed to creating voxel trees having the same shape as the outer shapes of multiple X-ray imaging mechanisms. (Specification, page 12, paragraphs 2-3.) Collision detection calculations are performed between voxels to determine whether there is actually collision between the imaging mechanisms. (Specification, page 13, paragraph 3.) This data is utilized to control the positions of the actual imaging mechanisms. (Specification, page 14, paragraphs 2-4.) Wakabayashi does not disclose or suggest the use of voxel trees for collision detection in the motion control of any device, much less a medical or x-

If there are any other issues remaining which the Examiner believes could be resolved through a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned at the telephone number indicated below.

Dated: May 9, 2006

Respectfully submitted,

By

A handwritten signature in black ink, appearing to read 'R. Katz', written over a horizontal line.

Richard J. Katz

Registration No.: 47,698

DARBY & DARBY P.C.

P.O. Box 5257

New York, New York 10150-5257

(212) 527-7700

(212) 527-7701 (Fax)

Attorneys/Agents For Applicant